

HP StorageWorks D2200sb PCIe Storage Blade User Guide

Abstract

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.



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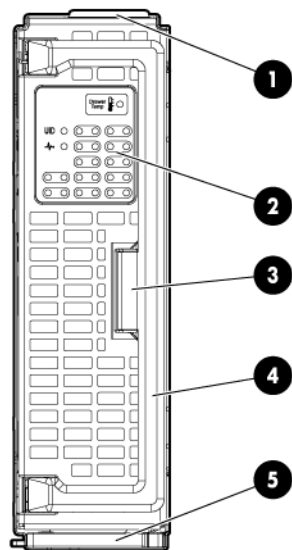
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Component identification

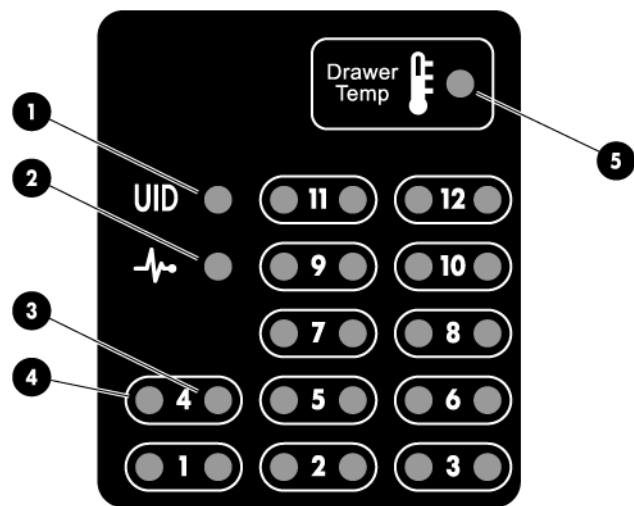
Front panel components



Item	Description
1	Product information tag
2	LED panel
3	Drive drawer release latch
4	Drive drawer handle
5	Storage blade locking lever*

* Removing the storage blade from the enclosure removes power from the drives.

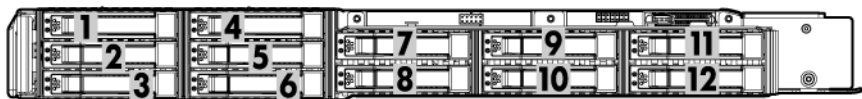
Front panel LEDs



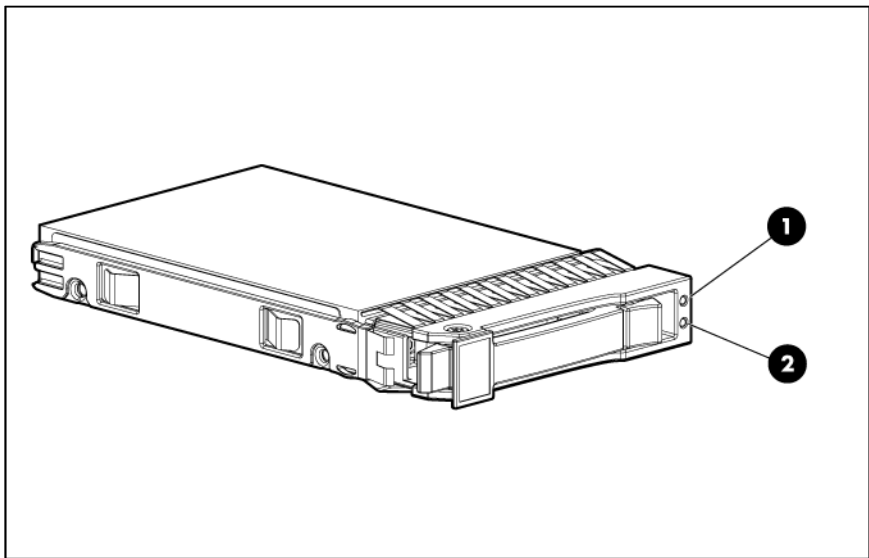
Item	Description	Status
1	UID LED	Blue = Identified Off = Not identified
2	System health LED*	Green = Normal operation Flashing amber = No partner blade, or not yet recognized Solid amber = Degraded condition Flashing red = System critical Red = Drive over-temperature triggered shutdown
3	Drive fault LED	Off = Normal operation Solid amber = Drive failed Flashing amber = Predictive failure
4	Drive activity LED	Solid green = Drive installed Flashing green = Drive activity established Flashing green (slow) = Drive rebuilding
5	Drawer temp LED	Off = Drawer is closed, or thermal shutdown has occurred. Flashing amber (1 per 5 seconds) = Drawer is open. Flashing amber (2 per second) = Drives have reached near-critical temperatures.

* The system health LED flashes amber when the storage blade establishes a connection with the enclosure, either immediately after installation or when the storage blade is removed and reinstalled. If the LED continues to flash for more than 2 minutes, there is a fault. Make sure the partner server blade is powered down before the storage blade is installed.

SAS and SATA hard drive bay numbers



SAS and SATA hard drive LEDs



Item	Description
1	Fault/UID LED (amber/blue)
2	Online LED (green)

SAS and SATA hard drive LED combinations

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
On, off, or flashing	Alternating amber and blue	The drive has failed, or a predictive failure alert has been received for this drive; it also has been selected by a management application.
On, off, or flashing	Steadily blue	The drive is operating normally, and it has been selected by a management application.
On	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
On	Off	The drive is online, but it is not active currently.
Flashing regularly (1 Hz)	Amber, flashing regularly (1 Hz)	Do not remove the drive. Removing a drive may terminate the current operation and cause data loss. The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not replace the drive until the expansion or migration is complete.
Flashing regularly (1 Hz)	Off	Do not remove the drive. Removing a drive may terminate the current operation and cause data loss. The drive is rebuilding, erasing, or it is part of an array that is undergoing capacity expansion or stripe migration.
Flashing irregularly	Amber, flashing regularly (1 Hz)	The drive is active, but a predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Flashing irregularly	Off	The drive is active, and it is operating normally.
Off	Steadily amber	A critical fault condition has been identified for this drive, and the controller has placed it offline. Replace the drive as soon as possible.
Off	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or not configured as part of an array.

Operations



Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

Power down the partner server blade

In systems that use the storage blade as external data storage, be sure that the partner server blade is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system and the OS are shut down in an orderly manner.



IMPORTANT: If installing a hot-plug device, it is not necessary to power down the storage blade.

To power down the storage blade, power down the partner server blade. See the server blade documentation.

Power up the storage blade

Observe the following guidelines before powering up the storage blade:

- Be sure that a hard drive is installed in the first hard drive bay. The partner server blade identifies and configures any installed hard drives during power up. For more information, see "Hard drives (on page 18)."
- Be sure that hard drives or hard drive blanks are installed in the second and third hard drive bays. To prevent improper cooling and thermal damage, the first three hard drive bays must be populated.
- Be sure that the partner server blade is powered down.
- Be sure that the storage blade is installed as shown in the installation guidelines (on page 14).

To power up the storage blade:

1. Install the storage blade. The system health LED flashes amber.
2. Power up the partner server blade. See the server blade documentation.
3. Observe the storage blade system health LED. When the storage blade is recognized, the system health LED illuminates solid green.

The storage blade can now be viewed in Onboard Administrator.

Power down the storage blade

In systems that use the storage blade as external data storage, be sure that the partner server blade is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system and the OS are shut down in an orderly manner.



IMPORTANT: If installing a hot-plug device, it is not necessary to power down the storage blade.

To power down the storage blade, power down the partner server blade. See the server blade documentation.

Remove the storage blade



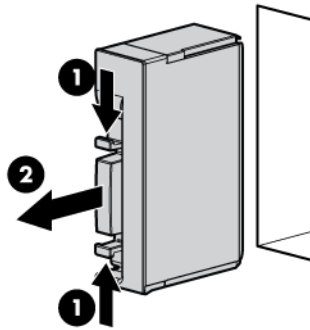
WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.



CAUTION: To prevent damage to electrical components, properly ground the storage blade before beginning any installation procedure. Improper grounding can cause ESD.

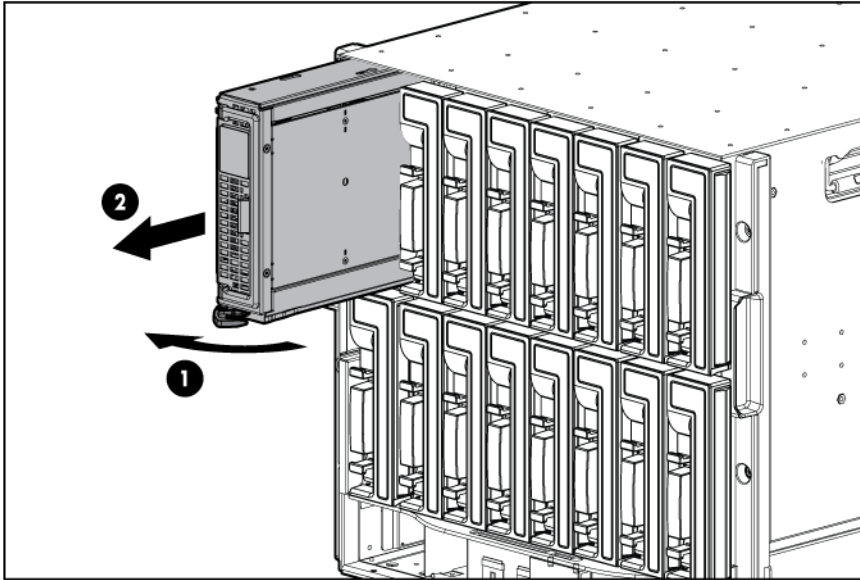
To remove the component:

1. Identify the proper storage blade.
2. Power down the partner server blade (on page 9).
3. If the partner server blade is a full-height server blade, do one of the following:
 - Remove the blank installed above the storage blade.

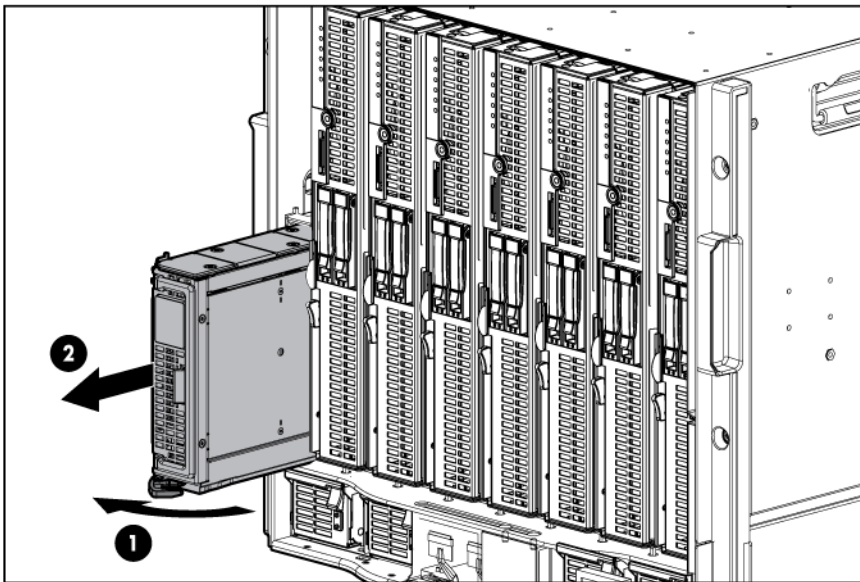


- Remove the half-height device installed above the storage blade.
For information about removing a half-height device, see the half-height device user guide.
4. Remove the storage blade:

- Partnered with a half-height server blade



- Partnered with a full-height server blade



5. Place the storage blade on a flat, level work surface.

Remove the access panel

- ⚠ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.
- ⚠ **CAUTION:** To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.
- ⚠ **CAUTION:** Do not operate the storage blade with the access panel open or removed. Operating the storage blade in this manner results in improper airflow and improper cooling that can lead to thermal damage.

To remove the component:

1. Power down the partner server blade (on page 9).
2. Remove the storage blade (on page 10).
3. Press the access panel release button.
4. Slide the access panel toward the rear of the storage blade.
5. Remove the access panel.

Install the access panel



WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.



CAUTION: To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.



CAUTION: Do not operate the storage blade with the access panel open or removed. Operating the storage blade in this manner results in improper airflow and improper cooling that can lead to thermal damage.

To install the component:

1. Place the access panel on top of the storage blade. Allow the panel to extend past the rear of the storage blade approximately 0.8 cm (0.2 in).
2. Slide the access panel toward the front of the storage blade. The access panel locks into position.

Setup

Kit contents

When unpacking the HP StorageWorks D2200sb PCIe storage blade, locate the following items:

- HP StorageWorks D2200sb PCIe storage blade
- Half-height blade shelf
- Documentation kit

Installing an HP BladeSystem c-Class enclosure

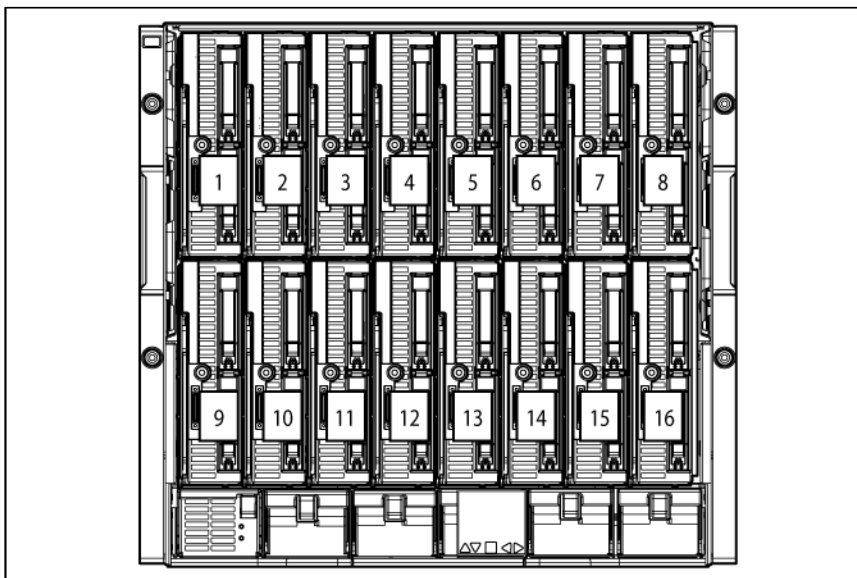
Before performing any procedures specific to the storage blade, install an HP BladeSystem c-Class enclosure.

The most current documentation for HP BladeSystem components is available at the HP Business Support Center website (<http://www.hp.com/go/bizsupport>).

Documentation is also available in the following locations:

- Documentation CD that ships with the enclosure
- HP technical support website (<http://www.hp.com/support>)

Half-height device bay numbering



Installation guidelines

When installing the storage blade, observe the following guidelines:

- Install hard drives in the storage blade before installing the storage blade in the enclosure.
- Be sure that the partner server blade is powered down before installing the storage blade.

Onboard Administrator is used to configure the enclosure and the storage blade. To function with the storage blade, Onboard Administrator version 3.10 or later is required.

Additional guidelines for installation with a half-height partner server blade

When installing the storage blade with a half-height server blade, observe the following additional guidelines:

- Install the storage blade in any device bay.
- If the storage blade is installed in an odd-numbered bay, install the partner server blade in the adjacent even-numbered bay to the right.
- If the storage blade is installed in an even-numbered bay, install the partner server blade in the adjacent odd-numbered bay to the left.

Additional guidelines for installation with a full-height partner server blade

When installing the storage blade with a full-height server blade, observe the following additional guidelines:

- Remove the device bay shelf.
- Install a PCI-Express mezzanine card into the server. For server-specific information, see the storage blade QuickSpecs.
- Install the half-height blade shelf on the storage blade.
- Install the storage blade in any device bay on the lower row of the enclosure (9 through 16).

If installing two storage blades with one partner server blade, install the second storage blade in the bay directly above the first one.

If installing two storage blades with one partner server blade in an HP BladeSystem c3000 Enclosure, use the mini divider instead of the half-height blade shelf. For more information, see the *HP BladeSystem c3000 Enclosure Quick Setup Instructions*.

- If the storage blade is installed in an odd-numbered bay, install the partner server blade in the adjacent even-numbered bay to the right.
- If the storage blade is installed in an even-numbered bay, install the partner server blade in the adjacent odd-numbered bay to the left.
- When installing the storage blade with a full-height server blade, a half-height server blade can be installed in the empty bay above the storage blade. This server blade cannot be partnered with the storage blade.

Installing a storage blade

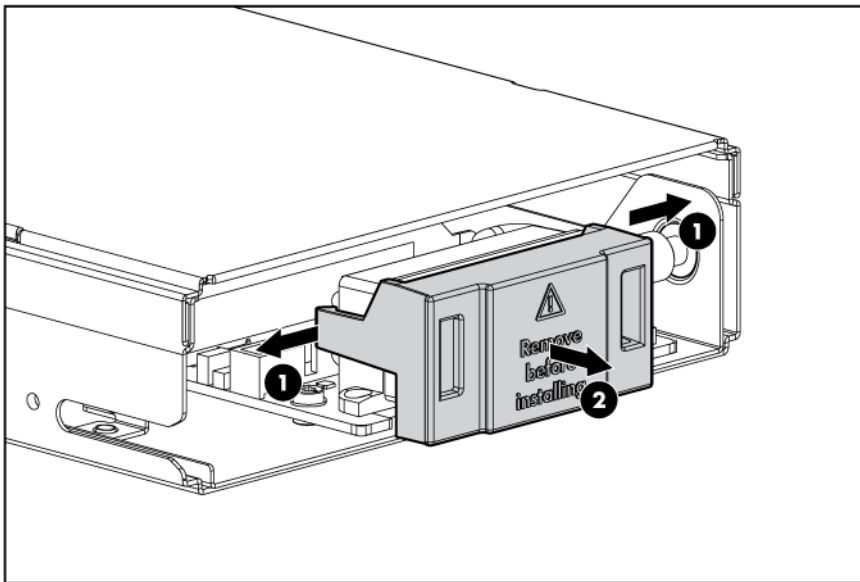
△ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the storage blade or the enclosure unless the first drive bay is populated with a drive, and drive bays 2 and 3 and all device bays are populated with either a component or a blank.

△ **CAUTION:** Thermal regulation is maintained only when the drive drawer is closed. The drive temperature alarm is triggered under the following conditions:

- A slow beep and flash (1 every 5 seconds) indicate that the drive drawer is open. The drives are not fully protected by system air flow.
- A fast beep and flash (2 per second)—To avoid drive damage or data loss and storage blade shutdown, close the drive drawer immediately.

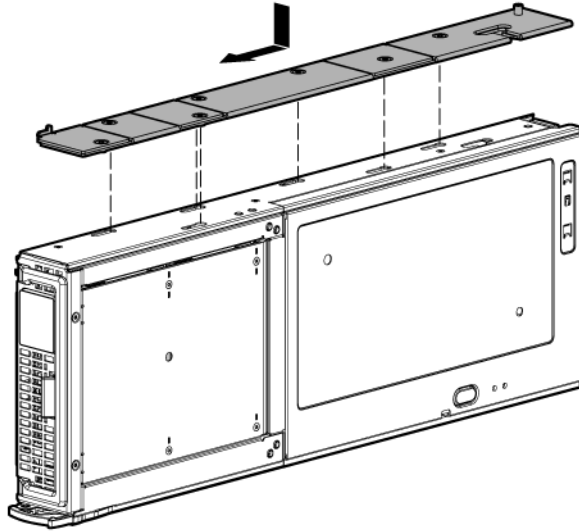
When the drives reach critical temperatures, the system shuts down.

1. Install the hard drives ("[Installing a hard drive](#)" on page 18).
2. Remove the enclosure connector cover.



3. Identify the partner server blade to be installed with the storage blade:
 - To install the storage blade with a half-height server blade, proceed with the next step.

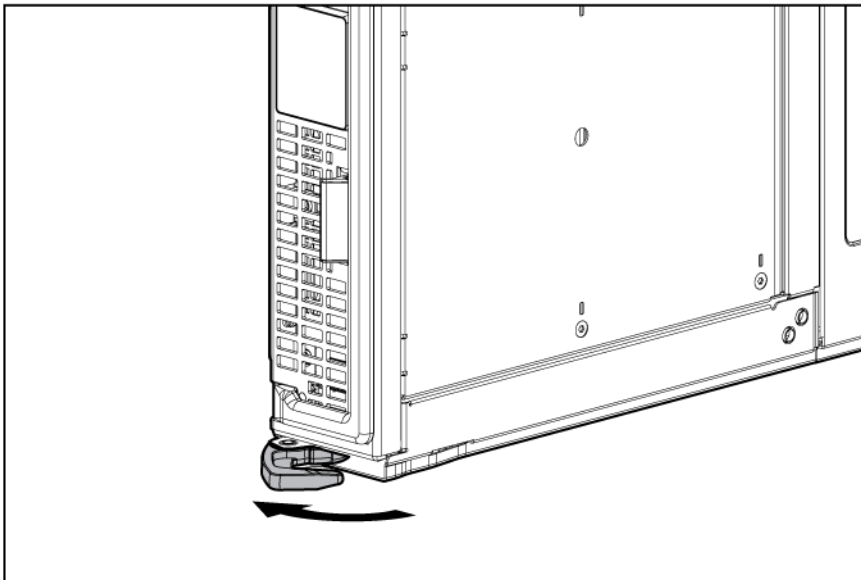
- To install the storage blade with a full-height server blade, install the half-height blade shelf.



If installing two storage blades with one partner server blade, install the second storage blade in the bay directly above the first one.

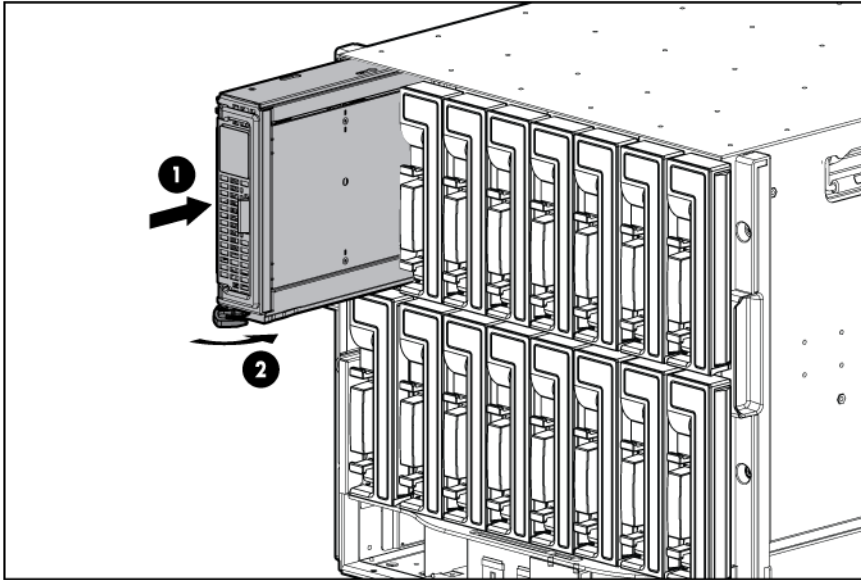
If installing two storage blades with one partner server blade in an HP BladeSystem c3000 Enclosure, use the mini divider instead of the half-height blade shelf. For more information, see the *HP BladeSystem c3000 Enclosure Quick Setup Instructions*.

4. Prepare the storage blade for installation.

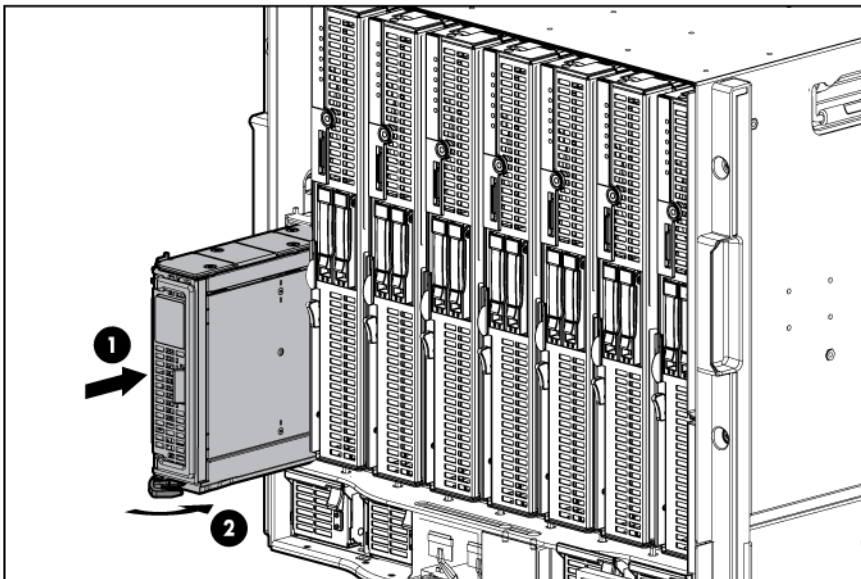


5. Install the storage blade:

- Partnered with a half-height server blade



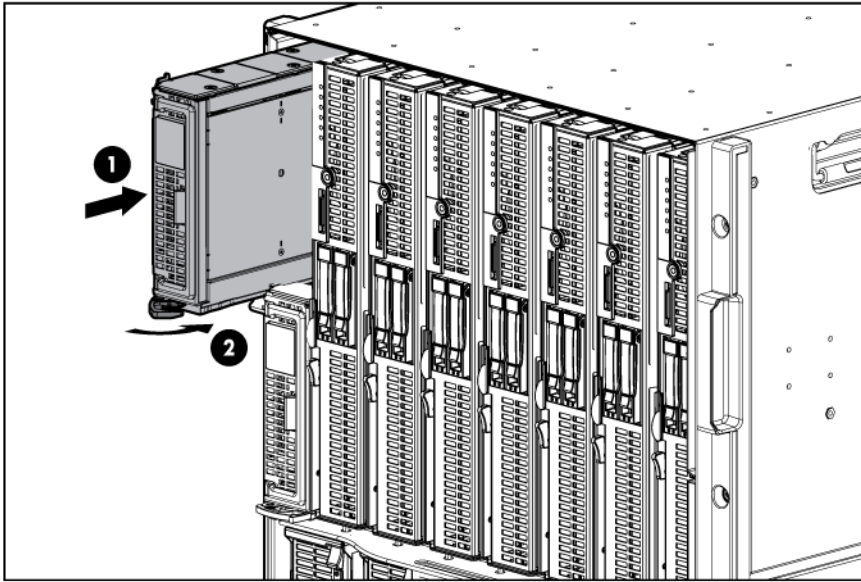
- Partnered with a full-height server blade



- Partnered with a full-height server blade and an additional storage blade



IMPORTANT: Most full-height server blades connect to one or two storage blades through a PCI Express Mezzanine card installed in the server. For server-specific information, see the storage blade QuickSpecs.



6. Install a server blade. See the documentation that ships with the server blade.
7. Configure the storage blade ("[Configuration tools](#)" on page 23).

Hard drives

The storage blade supports up to 12 SAS or 12 SATA hard drives. Always populate hard drive bays starting with the lowest hard drive bay number ("[SAS and SATA hard drive bay numbers](#)" on page 7).

Hard drive guidelines

When adding hard drives to the storage blade, observe the following general guidelines:

- The storage blade supports standard small form factor hot plug carriers only.
- The system automatically sets all device numbers.
- If only one hard drive is used, install it in hard drive bay 1 ("[SAS and SATA hard drive bay numbers](#)" on page 7).
- Hard drives must be hot-plug, SFF types.
- Drives should be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

Installing a hard drive

This procedure describes first-time installation only.

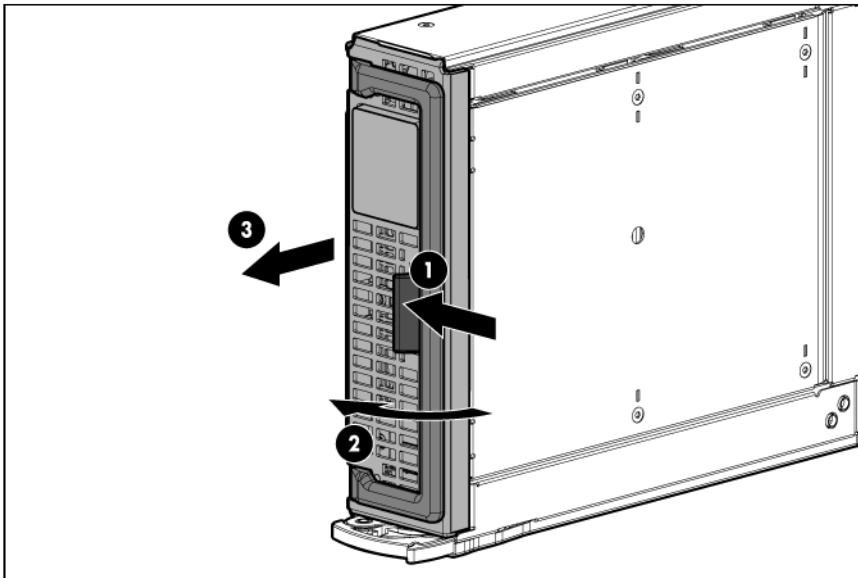
-
- △ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the storage blade or the enclosure unless the first drive bay is populated with a drive, and drive bays 2 and 3 and all device bays are populated with either a component or a blank.
-
- △ **CAUTION:** Thermal regulation is maintained only when the drive drawer is closed. The drive temperature alarm is triggered under the following conditions:
- A slow beep and flash (1 every 5 seconds) indicate that the drive drawer is open. The drives
-

are not fully protected by system air flow.

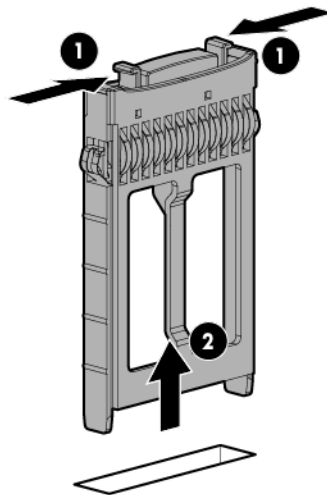
- A fast beep and flash (2 per second)—To avoid drive damage or data loss and storage blade shutdown, close the drive drawer immediately.

When the drives reach critical temperatures, the system shuts down.

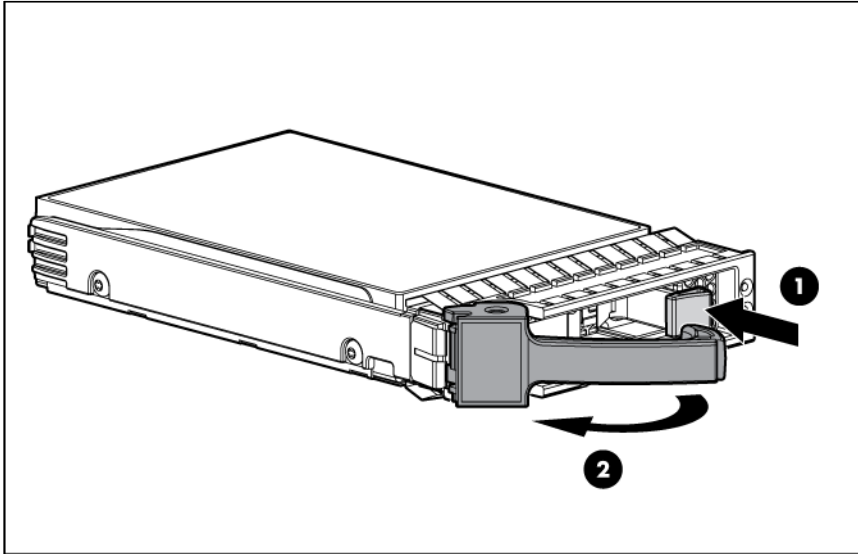
1. Open the hard drive drawer.



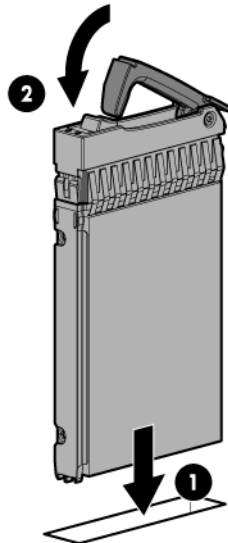
2. Remove the hard drive blank.



3. Prepare the hard drive.



4. Install the hard drive.



5. Install the storage blade in the enclosure.
6. Power up the partner server blade. See the server blade documentation.
7. Determine the status of the drive from the hot-plug SAS or SATA drive LED combinations ("[SAS and SATA hard drive LED combinations](#)" on page 7).
8. Configure the storage blade ("[Configuration tools](#)" on page 23).

Flash-backed write cache (FBWC) option

FBWC consists of a cache module and a capacitor pack. The DDR cache module buffers and stores data being written by the controller. When the system is powered on, the capacitor pack charges fully in about 5 minutes. In the event of a system power failure, a fully charged capacitor pack provides power for up to 80 seconds. During that interval, the controller transfers the cached data from DDR memory to flash memory, where the data remains indefinitely or until a controller retrieves the data.



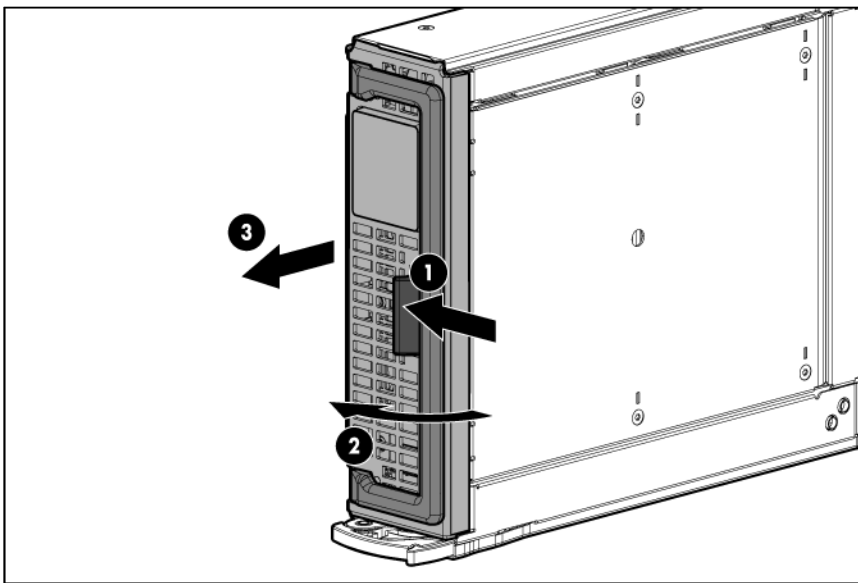
WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.



CAUTION: To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

To install the component:

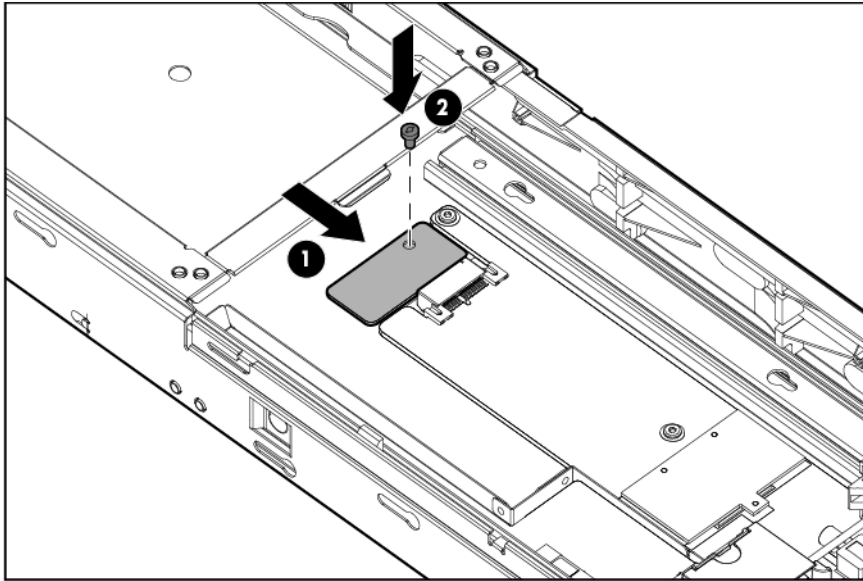
1. Back up all data on the storage blade.
2. Power down the partner server blade. For more information, see the server blade documentation.
3. Remove the storage blade from the enclosure ("[Remove the storage blade](#)" on page 10).
4. Place the storage blade on a flat, level work surface.
5. Remove the access panel (on page 11).
6. Open the hard drive drawer. Extend the hard drive far enough to gain access to FBWC socket.



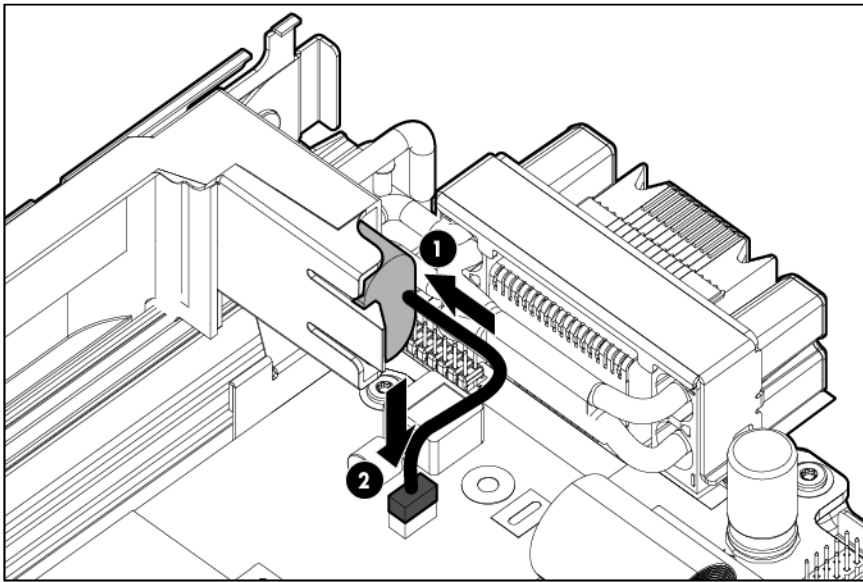
CAUTION: To prevent damage to the cache module during installation, be sure the cache module is fully inserted before pressing down.

For the remaining steps, the hard drive drawer and cable spool are not shown for clarity.

7. Install the FBWC module. To avoid possible damage to the storage blade, be sure that the module is fully seated before installing the screw.



8. Install the FBWC capacitor pack.



9. Close the hard drive drawer.
10. Install the access panel (on page 12).
11. Install the storage blade in the enclosure.
12. Power up the partner server blade. See the server blade documentation.

The capacitor pack is fully charged in approximately 5 minutes. The cache module provides improved storage blade performance during that time. Data is protected against an unplanned power failure after the 5 minute interval.

Configuration and utilities

Configuration tools

Array Configuration Utility

ACU is a browser-based utility with the following features:

- Runs as a local application or remote service
- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration
- Suggests the optimum configuration for an unconfigured system
- Provides different operating modes, enabling faster configuration or greater control over the configuration options
- Remains available any time that the server is on
- Displays on-screen tips for individual steps of a configuration procedure
- Beginning with ACU version 8.28.13.0, provides diagnostic functionality on the Diagnostics tab (formerly known as Array Diagnostics Utility).

For optimum performance, the minimum display settings are 1024 × 768 resolution and 16-bit color. Servers running Microsoft® operating systems require one of the following supported browsers:

- Internet Explorer 6.0 or later
- Mozilla Firefox 2.0 or later

For Linux servers, see the README.TXT file for additional browser and support information.

For more information about the controller and its features, see the *HP Smart Array Controllers for HP ProLiant Servers User Guide* on the HP website

(<http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c01608507/c01608507.pdf>). To configure arrays, see the *Configuring Arrays on HP Smart Array Controllers Reference Guide* on the HP website

(<http://bizsupport1.austin.hp.com/bc/docs/support/SupportManual/c00729544/c00729544.pdf>).

Option ROM Configuration for Arrays

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility also provides support for the following functions:

- Reconfiguring one or more logical drives
- Viewing the current logical drive configuration
- Deleting a logical drive configuration

- Setting the controller to be the boot controller
- Selecting the boot volume

If you do not use the utility, ORCA will default to the standard configuration.

For more information regarding the default configurations that ORCA uses, see the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

For more information about the controller and its features, see the *HP Smart Array Controllers for HP ProLiant Servers User Guide* on the HP website

(<http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c01608507/c01608507.pdf>). To configure arrays, see the *Configuring Arrays on HP Smart Array Controllers Reference Guide* on the HP website

(<http://bizsupport1.austin.hp.com/bc/docs/support/SupportManual/c00729544/c00729544.pdf>).

Management tools

HP Systems Insight Manager

HP SIM is a web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a web browser. HP SIM provides device management capabilities that consolidate and integrate management data from HP and third-party devices.



IMPORTANT: You must install and use HP SIM to benefit from the Pre-Failure Warranty for processors, SAS and SATA hard drives, and memory modules.

For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP SIM website (<http://www.hp.com/go/hpsim>).

Management Agents

Management Agents provide the information to enable fault, performance, and configuration management. The agents allow easy manageability of the server through HP SIM software, and third-party SNMP management platforms. Management Agents are installed with every SmartStart assisted installation or can be installed through the HP PSP. The Systems Management homepage provides status and direct access to in-depth subsystem information by accessing data reported through the Management Agents. For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP website (<http://www.hp.com/servers/manage>).

Diagnostic tools

Array Diagnostic Utility

The HP Array Diagnostics Utility is a web-based application that creates a report of all HP storage controllers and disk drives. This report provides vital information to assist in identifying faults or conditions that may require attention. ADU can be accessed from the SmartStart CD or downloaded from the HP website (<http://www.hp.com>).

Remote support and analysis tools

HP Insight Remote Support software

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable enhanced delivery of your HP Warranty, HP Care Pack Service, or HP contractual support agreement. HP Insight Remote Support supplements your monitoring 24 x 7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The software is available in two variants:

- **HP Insight Remote Support Standard:** This software supports server and storage devices and is optimized for environments with 1–50 servers. Ideal for customers who can benefit from proactive notification but do not need proactive service delivery and integration with a management platform.
- **HP Insight Remote Support Advanced:** This software provides comprehensive remote monitoring and proactive service support for nearly all HP servers, storage, network, and SAN environments, plus selected non-HP servers that have a support obligation with HP. It is integrated with HP Systems Insight Manager. A dedicated server is recommended to host both HP Systems Insight Manager and HP Insight Remote Support Advanced.

Details for both versions are available on the HP website (<http://www.hp.com/go/insightremotesupport>).

To download the software, go to Software Depot (<http://www.software.hp.com>).

Select **Insight Remote Support** from the menu on the right.

Keeping the system current

Change control and proactive notification

HP offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of upcoming hardware and software changes on HP commercial products.

For more information, refer to the HP website (<http://www.hp.com/go/pcn>).

Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand bundled services with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. For more information, see the HP website (<http://www.hp.com/services/carepack>).

Firmware updates

Download firmware updates from the following locations:

- The ProLiant Support Pack available on the HP website (<http://h18004.www1.hp.com/products/servers/management/psp/>)
- The HP Smart Components available on the HP ProLiant Firmware Maintenance CD and the HP website (<http://www.hp.com/support>)

- The most recent version of a particular server blade or option firmware from the HP website (<http://www.hp.com/support>)
- Components for option firmware updates available from the HP website (<http://www.hp.com/support>)

Running the SmartStart CD also provides updated firmware.

HP offers a subscription service that can provide notification of firmware updates. For more information, see "Subscriber's Choice (on page 26)."

Subscriber's choice

HP's Subscriber's Choice is a customizable subscription sign-up service that customers use to receive personalized email product tips, feature articles, driver and support alerts, or other notifications.

To create a profile and select notifications, refer to the HP website (<http://www.hp.com/go/subscriberschoice>).

Troubleshooting

If the storage blade does not power up

If the storage blade does not start:

1. Be sure that the storage blade is installed adjacent to the partner server blade.
2. Use the Onboard Administrator to be sure that sufficient power is available.
3. Use the Onboard Administrator to verify that sufficient cooling is available.
4. Restart the partner server blade.



IMPORTANT: If the system does not restart, proceed to "Diagnostic Questions (on page 27)."

5. Verify that the storage blade front panel health LED changes from flashing amber to solid green.

Diagnostic questions

Is the storage blade operating properly?

Answer	Possible reasons	Possible solutions
No	The storage blade is not installed adjacent to the partner server blade.	Verify that the storage blade is installed adjacent to the partner server blade. See "Installation guidelines (on page 14)."
	The partner server blade was not restarted after the storage blade was installed.	Restart the server blade.
	The storage blade is not properly seated in the device bay.	1 Power down the partner server blade. 2 Reseat the storage blade in the device bay. 3 Restart the server blade.
	Insufficient power is available to operate the storage blade.	• Remove any unused server blades, storage blades, or interconnect devices. • Verify that the enclosure has sufficient power supply capacity available to operate all installed devices. • Verify that the enclosure power settings will enable the storage blade to start. • Add power supplies to meet the power requirement.
	Insufficient or improperly located enclosure cooling fans	• Verify that a sufficient number of cooling fans are in the enclosure. • Verify that the cooling fans are properly configured for the devices installed in the enclosure.
	The hard drive drawer was open too long and triggered overtemperature alerts.	Close the hard drive drawer and wait for normal operating temperatures to resume. A green health

Answer	Possible reasons	Possible solutions
		LED ("Front panel LEDs" on page 6) indicates normal temperature.
	The hard drive drawer was open too long and triggered critical overtemperature alerts.	Restart the partner server blade.

Recognizing hard drive failure

A steadily illuminated Fault LED on a hard drive indicates that the drive has failed.

Other indications of failed hard drives:

- ACU represents failed drives with a distinctive icon.
- HP SIM can detect failed drives remotely across a network. (For more information about HP SIM, refer to the documentation on the Management CD.)
- ADU lists all failed drives.
- CPQONLIN identifies failed drives in a NetWare environment.

For additional information about diagnosing hard drive problems, see the *HP ProLiant Servers Troubleshooting Guide*.



CAUTION: Sometimes, a drive that has previously failed may seem to be operational after the system is power-cycled or (for a hot-pluggable drive) after the drive has been removed and reinserted. However, continued use of such marginal drives may eventually result in data loss. Replace the marginal drive as soon as possible.

Effects of a hard drive failure

When a hard drive fails, all logical drives that are in the same array are affected. Each logical drive in an array may be using a different fault-tolerance method, so each logical drive can be affected differently.

- RAID 0 configurations cannot tolerate drive failure. If any physical drive in the array fails, all non-fault-tolerant (RAID 0) logical drives in the same array will also fail.
- RAID 1+0 configurations can tolerate multiple drive failures as long as no failed drives are mirrored to one another.
- RAID 5 configurations can tolerate one drive failure.
- RAID 6 configurations can tolerate simultaneous failure of two drives.

Compromised fault tolerance



CAUTION: When fault tolerance is compromised, data loss can occur. However, it may be possible to recover the data. For more information, see "Recovering from compromised fault tolerance (on page 29)."

If more drives fail than the fault-tolerance method can manage, fault tolerance is compromised, and the logical drive fails. If this failure occurs, the operating system rejects all requests and indicates unrecoverable errors.

For example, fault tolerance might occur when a drive in an array fails while another drive in the array is being rebuilt.

Compromised fault tolerance can also be caused by problems unrelated to drives. In such cases, replacing the physical drives is not required.

Recovering from compromised fault tolerance

If fault tolerance is compromised, inserting replacement drives does not improve the condition of the logical volume. Perform the following procedure to recover data:

1. Power down the storage blade (on page 9).
2. Power up the storage blade (on page 9).

In some cases, a marginal drive is operational long enough to allow backup of important files.

3. Make copies of important data, if possible.
4. Replace any failed drives.

Factors to consider before replacing hard drives

Be sure that the server blade is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system does not erroneously mark the drives as failed when the server blade is powered up.

Before replacing a degraded drive:

- Open HP SIM and inspect the Error Counter window for each physical drive in the same array to confirm that no other drives have any errors. (For details, refer to the HP SIM documentation on the Management CD.)
- Be sure that the array has a current, valid backup.
- Use replacement drives that have a capacity at least as great as that of the smallest drive in the array. The controller immediately fails drives that have insufficient capacity.

To minimize the likelihood of fatal system errors, take these precautions when removing failed drives:

- Do not remove a degraded drive if any other drive in the array is offline (the online LED is off). In this situation, no other drive in the array can be removed without data loss.

Exceptions:

- When RAID 1+0 is used, drives are mirrored in pairs. Several drives can be in a failed condition simultaneously (and they can all be replaced simultaneously) without data loss, as long as no two failed drives belong to the same mirrored pair.
- When RAID 6 is used, two drives can fail simultaneously (and be replaced simultaneously) without data loss.
- If the offline drive is a spare, the degraded drive can be replaced.
- Do not remove a second drive from an array until the first failed or missing drive has been replaced **and** the rebuild process is complete. (The rebuild is complete when the online LED on the front of the drive stops blinking.)

These cases are the exceptions:

- In RAID 6 configurations, any two drives in the array can be replaced simultaneously.

- In RAID 1+0 configurations, any drives that are not mirrored to other removed or failed drives can be simultaneously replaced offline without data loss.

Automatic data recovery (rebuild)

When you replace a hard drive in an array, the controller uses the fault-tolerance information on the remaining drives in the array to reconstruct the missing data (the data that was originally on the replaced drive) and write it to the replacement drive. This process is called automatic data recovery, or rebuild. If fault tolerance is compromised, this data cannot be reconstructed and is likely to be lost permanently.

If another drive in the array fails while fault tolerance is unavailable during rebuild, a fatal system error may occur, and all data on the array is then lost. In exceptional cases, however, failure of another drive need not lead to a fatal system error. These exceptions include:

- Failure after activation of a spare drive
- Failure of a drive that is not mirrored to any other failed drives (in a RAID 1+0 configuration)
- Failure of a second drive in a RAID 6 configuration

Time required for a rebuild

The time required for a rebuild varies considerably, depending on several factors:

- The priority that the rebuild is given over normal I/O operations (you can change the priority setting by using ACU)
- The amount of I/O activity during the rebuild operation
- The rotational speed of the hard drives
- The availability of drive cache
- The brand, model, and age of the drives
- The amount of unused capacity on the drives
- The number of drives in the array (for RAID 5 and RAID 6)

Allow approximately 15 minutes per gigabyte for the rebuild process to be completed. This period is a conservative estimate, and newer drive models usually require less time to rebuild.

System performance is affected during the rebuild, and the system is unprotected against further drive failure until the rebuild has finished. Therefore, replace drives during periods of low activity when possible.



CAUTION: If the Online LED of the replacement drive stops blinking and the amber Fault LED glows, or if other drive LEDs in the array go out, the replacement drive has failed and is producing unrecoverable disk errors. Remove and replace the failed replacement drive.

When automatic data recovery has finished, the online LED of the replacement drive stops flashing and illuminates steadily.

Failure of another drive during rebuild

If a non-correctable read error occurs on another physical drive in the array during the rebuild process, the Online LED of the replacement drive stops blinking and the rebuild abnormally terminates.

If this situation occurs, reboot the server. The system may temporarily become operational long enough to allow recovery of unsaved data. In any case, locate the faulty drive, replace it, and restore data from backup.

Drive failure in a NetWare environment

Use CPQONLIN to identify and monitor drive failure status in a NetWare environment. For more information, see *Configuring Arrays on HP Smart Array Controllers* on the HP website (<http://bizsupport1.austin.hp.com/bc/docs/support/SupportManual/c00729544/c00729544.pdf>).

Failed drives or interim recovery mode

If a drive fails and hardware fault tolerance is enabled, operation continues. Do the following:

1. Replace the drive as soon as possible.
2. Select a logical drive using ACU ("Array Configuration Utility" on page 23) to monitor the status of drive recovery.

or

In a NetWare environment: Press the **F3** key to monitor the status of drive recovery.

Drive status messages include:

- **Interim Recovery:** The current array controller has a bad or missing drive. The logical drive is operating with reduced performance and a further physical drive failure may result in data loss depending on the fault tolerance. Configuration changes to this logical drive or any other logical drive in the array are not allowed until this problem is corrected. To correct this problem, check the data and power connections to the physical drives or replace the failed drive. For more information, generate a diagnostics report under the Diagnostics tab.
- **Ready for Recovery:** The logical drives are queued for recovery. This status appears when another logical drive is already rebuilding or expanding.
- **Rebuilding:** The array controller is rebuilding the drive. Configuration changes to logical drives in the array are not allowed until rebuilding is complete. Also, configuration changes to any other array that is waiting for expansion or rebuild are not possible until this process completes. If unused space exists, additional logical drives can be created. Otherwise, most configuration changes are not allowed until this process is complete.
- **Logical Drive Failed:** The logical drive has failed and cannot be used. All data on this logical drive has been lost. Configuration changes to this logical drive are not allowed until this problem is corrected. Also, if your controller supports Expansion, Extension, or Migration, these operations will not be available for any logical drives in the array until the problem is corrected. Replace any failed physical drives and re-enable the failed logical drive. For more information, generate a diagnostics report under the Diagnostics tab.

If you do not replace the failed drive, the only option, using ACU, is to delete logical drives. Do **not** delete logical drives that contain valid data. Doing so results in data loss.

NOTE: A failed status can occur on drives protected by fault tolerance if two or more physical drives fail concurrently.

Some status messages are available without pressing the **F3** key. For example, on the Main menu, the FAILED status appears next to the logical drive that has failed. EXPANDING and REBUILDING appear next to the array in which the activity is occurring.

Handling disk drive failures

If the storage blade was configured with hardware fault tolerance, complete the following steps after a disk drive failure:

1. Determine which physical drive failed. On hot-plug drives, an amber drive failure LED illuminates.
2. If the unit containing the failed drive does not support hot-plug drives, perform a normal shutdown ("[Power down the storage blade](#)" on page 9).
3. Remove the failed drive and replace it with a drive that is of the same capacity. For hot-plug drives, after you secure the drive in the bay, the LEDs on the drive each flash once in an alternating pattern to indicate a successful connection. The online LED flashes, indicating that the storage blade recognizes the drive replacement and has begun the recovery process.
4. If applicable, power up the partner server blade. For more information, see the server blade documentation.
5. The storage blade reconstructs the information on the new drive, based on information from the remaining physical drives in the logical drive. While reconstructing the data on hot-plug drives, the online LED flashes. When the drive rebuild is complete, the online LED is illuminated.

NetWare cannot detect a single physical drive failure when using hardware-based fault tolerance, but determines that the data is still valid and accessible during the rebuilding process. However, the driver knows that a physical drive has failed. A message is printed on the console notifying the user that a physical drive is in a degraded state. CPQONLIN also shows that the drive has failed.

Regulatory compliance notices

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

European Union regulatory notice

Products bearing the CE marking comply with the following EU Directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Ecodesign Directive 2009/125/EC, where applicable

CE compliance of this product is valid if powered with the correct CE-marked AC adapter provided by HP.

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) that are listed in the EU Declaration of Conformity issued by HP for this product or product family and available (in English only) either within the product documentation or at the following HP website (<http://www.hp.eu/certificates>) (type the product number in the search field).

The compliance is indicated by one of the following conformity markings placed on the product:

For non-telecommunications products and for EU harmonized telecommunications products, such as Bluetooth® within power class below 10mW.



For EU non-harmonized telecommunications products (If applicable, a 4-digit notified body number is inserted between CE and !).



Please refer to the regulatory label provided on the product.

The point of contact for regulatory matters is Hewlett-Packard GmbH, Dept./MS: HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, GERMANY.

Disposal of waste equipment by users in private households in the European Union



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

BSMI notice

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Korean class A notice

A급 기기 (업무용 방송통신기기)	이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.
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Chinese notice

Class A equipment

声明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对干扰采取可行的措施。

Acoustics statement for Germany (Geräuschemission)

Schalldruckpegel $L_{pA} < 70 \text{ dB(A)}$

Zuschauerpositionen (bystander positions), Normaler Betrieb (normal operation)

Nach ISO 7779:1999 (Typprüfung)

Electrostatic discharge

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Specifications

Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F) Maximum rate of change is 10° C/hr (50° F/hr)
Storage	-30°C to 60°C (-22°F to 140°F) Maximum rate of change is 20° C/hr (68° F/hr)
Relative humidity**	
Operating	20% to 80% relative humidity (Rh), 28° C (82.4° F) maximum wet bulb temperature, non-condensing
Storage	5% to 90% relative humidity (Rh), 38.7° C (101.66° F) maximum wet bulb temperature, non-condensing
Altitude †	
Operating	3048 m (10,000 ft) This value may be limited by the type and number of options installed.
Non-operating	9144 m (30, 000 ft)

* Temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight is allowed. The upper limit may be limited by the type and number of options installed.

** Storage maximum humidity of 90% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

† Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

Storage blade specifications

Specification	Value
Height	5.56 cm (2.19 in)
Depth	50.95 cm (20.06 in)
Width	18.16 cm (7.15 in)
Weight (maximum)	5.0 (11.0)
Weight (no drives installed)	3.6 (8.0)

Support and other resources

Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log
Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (<http://www.hp.com/go/ilo/docs>).
- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)
For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (<http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&objectID=c02843807>).
- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (<http://www.hp.com/go/assistance>).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (<http://www8.hp.com/us/en/support-drivers.html>). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (<http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html>).

Customer Self Repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service

providers or service partners) identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- **Mandatory**—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- **Optional**—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

NOTE: Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement CSR part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about HP's Customer Self Repair program, contact your local service provider. For the North American program, refer to the HP website (<http://www.hp.com/go/selfrepair>).

Réparation par le client (CSR)

Les produits HP comportent de nombreuses pièces CSR (Customer Self Repair = réparation par le client) afin de minimiser les délais de réparation et faciliter le remplacement des pièces défectueuses. Si pendant la période de diagnostic, HP (ou ses partenaires ou mainteneurs agréés) détermine que la réparation peut être effectuée à l'aide d'une pièce CSR, HP vous l'envoie directement. Il existe deux catégories de pièces CSR:

Obligatoire - Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

Facultatif - Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

REMARQUE: Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

Les pièces CSR sont livrées le jour ouvré suivant, dans la limite des stocks disponibles et selon votre situation géographique. Si votre situation géographique le permet et que vous demandez une livraison le jour même ou dans les 4 heures, celle-ci vous sera facturée. Pour bénéficier d'une assistance téléphonique, appelez le Centre d'assistance technique HP. Dans les documents envoyés avec la pièce de rechange CSR, HP précise s'il est nécessaire de lui retourner la pièce défectueuse. Si c'est le cas, vous devez le faire dans le délai indiqué, généralement cinq (5) jours ouvrés. La pièce et sa documentation doivent être retournées dans l'emballage fourni. Si vous ne retournez pas la pièce défectueuse, HP se réserve le droit de vous facturer les coûts de remplacement. Dans le cas d'une pièce CSR, HP supporte l'ensemble des frais d'expédition et de retour, et détermine la société de courses ou le transporteur à utiliser.

Pour plus d'informations sur le programme CSR de HP, contactez votre Mainteneur Agrée local. Pour plus d'informations sur ce programme en Amérique du Nord, consultez le site Web HP (<http://www.hp.com/go/selfrepair>).

Riparazione da parte del cliente

Per abbreviare i tempi di riparazione e garantire una maggiore flessibilità nella sostituzione di parti difettose, i prodotti HP sono realizzati con numerosi componenti che possono essere riparati direttamente dal cliente (CSR, Customer Self Repair). Se in fase di diagnostica HP (o un centro di servizi o di assistenza HP) identifica il guasto come riparabile mediante un ricambio CSR, HP lo spedisce direttamente al cliente per la sostituzione. Vi sono due categorie di parti CSR:

Obbligatorie – Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

Opzionali – Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese aggiuntive a seconda del tipo di garanzia previsto per il prodotto.

NOTA: alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

In base alla disponibilità e alla località geografica, le parti CSR vengono spedite con consegna entro il giorno lavorativo seguente. La consegna nel giorno stesso o entro quattro ore è offerta con un supplemento di costo solo in alcune zone. In caso di necessità si può richiedere l'assistenza telefonica di un addetto del centro di supporto tecnico HP. Nel materiale fornito con una parte di ricambio CSR, HP specifica se il cliente deve restituire dei componenti. Qualora sia richiesta la resa ad HP del componente difettoso, lo si deve spedire ad HP entro un determinato periodo di tempo, generalmente cinque (5) giorni lavorativi. Il componente difettoso deve essere restituito con la documentazione associata nell'imballo di spedizione fornito. La mancata restituzione del componente può comportare la fatturazione del ricambio da parte di HP. Nel caso di riparazione da parte del cliente, HP sostiene tutte le spese di spedizione e resa e sceglie il corriere/vettore da utilizzare.

Per ulteriori informazioni sul programma CSR di HP contattare il centro di assistenza di zona. Per il programma in Nord America fare riferimento al sito Web HP (<http://www.hp.com/go/selfrepair>).

Customer Self Repair

HP Produkte enthalten viele CSR-Teile (Customer Self Repair), um Reparaturzeiten zu minimieren und höhere Flexibilität beim Austausch defekter Bauteile zu ermöglichen. Wenn HP (oder ein HP Servicepartner) bei der Diagnose feststellt, dass das Produkt mithilfe eines CSR-Teils repariert werden kann, sendet Ihnen HP dieses Bauteil zum Austausch direkt zu. CSR-Teile werden in zwei Kategorien unterteilt:

Zwingend – Teile, für die das Customer Self Repair-Verfahren zwingend vorgegeben ist. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.

Optional – Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

HINWEIS: Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No“ bzw. „Nein“ gekennzeichnet.

CSR-Teile werden abhängig von der Verfügbarkeit und vom Lieferziel am folgenden Geschäftstag geliefert. Für bestimmte Standorte ist eine Lieferung am selben Tag oder innerhalb von vier Stunden gegen einen Aufpreis verfügbar. Wenn Sie Hilfe benötigen, können Sie das HP technische Support Center anrufen und sich von einem Mitarbeiter per Telefon helfen lassen. Den Materialien, die mit einem CSR-Ersatzteil geliefert werden, können Sie entnehmen, ob das defekte Teil an HP zurückgeschickt werden muss. Wenn es erforderlich ist, das defekte Teil an HP zurückzuschicken, müssen Sie dies innerhalb eines vorgegebenen Zeitraums tun, in der Regel innerhalb von fünf (5) Geschäftstagen. Das defekte Teil muss mit der zugehörigen Dokumentation in der Verpackung zurückgeschickt werden, die im Lieferumfang enthalten ist. Wenn Sie das defekte Teil nicht zurückschicken, kann HP Ihnen das Ersatzteil in Rechnung stellen. Im Falle von Customer Self Repair kommt HP für alle Kosten für die Lieferung und Rücksendung auf und bestimmt den Kurier-/Frachtdienst.

Weitere Informationen über das HP Customer Self Repair Programm erhalten Sie von Ihrem Servicepartner vor Ort. Informationen über das CSR-Programm in Nordamerika finden Sie auf der HP Website unter (<http://www.hp.com/go/selfrepair>).

Reparaciones del propio cliente

Los productos de HP incluyen muchos componentes que el propio usuario puede reemplazar (*Customer Self Repair*, CSR) para minimizar el tiempo de reparación y ofrecer una mayor flexibilidad a la hora de realizar sustituciones de componentes defectuosos. Si, durante la fase de diagnóstico, HP (o los proveedores o socios de servicio de HP) identifica que una reparación puede llevarse a cabo mediante el uso de un componente CSR, HP le enviará dicho componente directamente para que realice su sustitución. Los componentes CSR se clasifican en dos categorías:

- **Obligatorio:** componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.
- **Opcional:** componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

NOTA: Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

Según la disponibilidad y la situación geográfica, los componentes CSR se enviarán para que lleguen a su destino al siguiente día laborable. Si la situación geográfica lo permite, se puede solicitar la entrega en el mismo día o en cuatro horas con un coste adicional. Si precisa asistencia técnica, puede llamar al Centro de asistencia técnica de HP y recibirá ayuda telefónica por parte de un técnico. Con el envío de materiales para la sustitución de componentes CSR, HP especificará si los componentes defectuosos deberán devolverse a HP. En aquellos casos en los que sea necesario devolver algún componente a HP, deberá hacerlo en el periodo de tiempo especificado, normalmente cinco días laborables. Los componentes defectuosos deberán devolverse con toda la documentación relacionada y con el embalaje de envío. Si no enviara el componente defectuoso requerido, HP podrá cobrarle por el de sustitución. En el caso de todas

sustituciones que lleve a cabo el cliente, HP se hará cargo de todos los gastos de envío y devolución de componentes y escogerá la empresa de transporte que se utilice para dicho servicio.

Para obtener más información acerca del programa de Reparaciones del propio cliente de HP, póngase en contacto con su proveedor de servicios local. Si está interesado en el programa para Norteamérica, visite la página web de HP siguiente (<http://www.hp.com/go/selfrepair>).

Customer Self Repair

Veel onderdelen in HP producten zijn door de klant zelf te repareren, waardoor de reparatieduur tot een minimum beperkt kan blijven en de flexibiliteit in het vervangen van defecte onderdelen groter is. Deze onderdelen worden CSR-onderdelen (Customer Self Repair) genoemd. Als HP (of een HP Service Partner) bij de diagnose vaststelt dat de reparatie kan worden uitgevoerd met een CSR-onderdeel, verzendt HP dat onderdeel rechtstreeks naar u, zodat u het defecte onderdeel daarmee kunt vervangen. Er zijn twee categorieën CSR-onderdelen:

Verplicht: Onderdelen waarvoor reparatie door de klant verplicht is. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.

Optioneel: Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garanteservice voor het product.

OPMERKING: Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

Afhankelijk van de leverbaarheid en de locatie worden CSR-onderdelen verzonden voor levering op de eerstvolgende werkdag. Levering op dezelfde dag of binnen vier uur kan tegen meerkosten worden aangeboden, indien dit mogelijk is gezien de locatie. Indien assistentie gewenst is, belt u een HP Service Partner om via de telefoon technische ondersteuning te ontvangen. HP vermeldt in de documentatie bij het vervangende CSR-onderdeel of het defecte onderdeel aan HP moet worden geretourneerd. Als het defecte onderdeel aan HP moet worden teruggezonden, moet u het defecte onderdeel binnen een bepaalde periode, gewoonlijk vijf (5) werkdagen, retourneren aan HP. Het defecte onderdeel moet met de bijbehorende documentatie worden geretourneerd in het meegeleverde verpakkingsmateriaal. Als u het defecte onderdeel niet terugzendt, kan HP u voor het vervangende onderdeel kosten in rekening brengen. Bij reparatie door de klant betaalt HP alle verzendkosten voor het vervangende en geretourneerde onderdeel en kiest HP zelf welke koerier/transportonderneming hiervoor wordt gebruikt.

Neem contact op met een Service Partner voor meer informatie over het Customer Self Repair programma van HP. Informatie over Service Partners vindt u op de HP website (<http://www.hp.com/go/selfrepair>).

Reparo feito pelo cliente

Os produtos da HP são projetados com muitas peças para reparo feito pelo cliente (CSR) de modo a minimizar o tempo de reparo e permitir maior flexibilidade na substituição de peças com defeito. Se, durante o período de diagnóstico, a HP (ou fornecedores/parceiros de serviço da HP) concluir que o reparo pode ser efetuado pelo uso de uma peça CSR, a peça de reposição será enviada diretamente ao cliente. Existem duas categorias de peças CSR:

Obrigatória – Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

Opcional – Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

OBSERVAÇÃO: Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

Conforme a disponibilidade e o local geográfico, as peças CSR serão enviadas no primeiro dia útil após o pedido. Onde as condições geográficas permitirem, a entrega no mesmo dia ou em quatro horas pode ser feita mediante uma taxa adicional. Se precisar de auxílio, entre em contato com o Centro de suporte técnico da HP para que um técnico o ajude por telefone. A HP especifica nos materiais fornecidos com a peça CSR de reposição se a peça com defeito deve ser devolvida à HP. Nos casos em que isso for necessário, é preciso enviar a peça com defeito à HP dentro do período determinado, normalmente cinco (5) dias úteis. A peça com defeito deve ser enviada com a documentação correspondente no material de transporte fornecido. Caso não o faça, a HP poderá cobrar a reposição. Para as peças de reparo feito pelo cliente, a HP paga todas as despesas de transporte e de devolução da peça e determina a transportadora/serviço postal a ser utilizado.

Para obter mais informações sobre o programa de reparo feito pelo cliente da HP, entre em contato com o fornecedor de serviços local. Para o programa norte-americano, visite o site da HP

(<http://www.hp.com/go/selfrepair>).

顧客自己修理保証サービス

修理時間を短縮し、故障部品の交換における高い柔軟性を確保するために、HP製品には多数の顧客自己修理（CSR）部品があります。診断の際に、CSR部品を使用すれば修理ができるとHP（HPまたはHP正規保守代理店）が判断した場合、HPはその部品を直接、お客様に発送し、お客様に交換していただきます。CSR部品には以下の2通りがあります。

- **必須** - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。
- **任意** - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、別途費用を負担していただくことなく保証サービスを受けることができます。

注：HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

部品供給が可能な場合、地域によっては、CSR部品を翌営業日に届くように発送します。また、地域によっては、追加費用を負担いただくことにより同日または4時間以内に届くように発送することも可能な場合があります。サポートが必要なときは、HPの修理受付窓口にご電話いただければ、技術者が電話でアドバイスします。交換用のCSR部品または同梱物には、故障部品をHPに返送する必要があるかどうかが表示されています。故障部品をHPに返送する必要がある場合は、指定期限内（通常は5営業日以内）に故障部品をHPに返送してください。故障部品を返送する場合は、届いた時の梱包箱に関連書類とともに入れてください。故障部品を返送しない場合、HPから部品費用が請求されます。顧客自己修理の際には、HPは送料および部品返送費を全額負担し、使用する宅配便会社や運送会社を指定します。

客户自行维修

HP 产品提供许多客户自行维修 (CSR) 部件，以尽可能缩短维修时间和在更换缺陷部件方面提供更大的灵活性。如果在诊断期间 HP（或 HP 服务提供商或服务合作伙伴）确定可以通过使用 CSR 部件完成维修，HP 将直接把该部件发送给您进行更换。有两类 CSR 部件：

- **强制性的** — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。
- **可选的** — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

注：某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

CSR 部件将在下一个工作日发运（取决于备货情况和允许的地理范围）。在允许的地理范围内，可在当天或四小时内发运，但要收取额外费用。如果需要帮助，您可以致电 HP 技术支持中心，将会有技术人员通过电话为您提供帮助。HP 会在随更换的 CSR 部件发运的材料中指明是否必须将有缺陷的部件返还给 HP。如果要求您将有缺陷的部件返还给 HP，那么您必须在指定期限内（通常是五 (5) 个工作日）将缺陷部件发给 HP。有缺陷的部件必须随所提供的发运材料中的相关文件一起返还。如果未能送还缺陷的部件，HP 可能会要求您支付更换费用。客户自行维修时，HP 将承担所有相关运输和部件返回费用，并指定快递员/承运商。

有关 HP 客户自行维修计划的详细信息，请与您当地的服务提供商联系。有关北美地区的计划，请访问 HP 网站 (<http://www.hp.com/go/selfrepair>)。

客戶自行維修

HP 產品設計了許多「客戶自行維修」(CSR) 的零件以減少維修時間，並且使得更換瑕疵零件時能有更大的彈性。如果在診斷期間 HP (或 HP 服務供應商或維修夥伴) 辨認出此項維修工作可以藉由使用 CSR 零件來完成，則 HP 將直接寄送該零件給您作更換。CSR 零件分為兩種類別：

- **強制的** — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。
- **選購的** — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

備註：某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

基於材料取得及環境允許的情況下，CSR 零件將於下一個工作日以快遞寄送。在環境的允許下當天或四小時內送達，則可能需要額外的費用。若您需要協助，可致電「HP 技術支援中心」，會有一位技術人員透過電話來協助您。不論損壞的零件是否必須退回，HP 皆會在與 CSR 替換零件一起運送的材料中註明。若要將損壞的零件退回 HP，您必須在指定的一段時間內（通常為五 (5) 個工作天），將損壞的零件寄回 HP。損壞的零件必須與寄送資料中隨附的相關技術文件一併退還。如果無法退還損壞的零件，HP 可能要向您收取替換費用。針對客戶自行維修情形，HP 將負責所有運費及零件退還費用並指定使用何家快遞/貨運公司。

如需 HP 的「客戶自行維修」方案詳細資訊，請連絡您當地的服務供應商。至於北美方案，請參閱 HP 網站 (<http://www.hp.com/go/selfrepair>)。

고객 셀프 수리

HP 제품은 수리 시간을 최소화하고 결함이 있는 부품 교체 시 더욱 융통성을 발휘할 수 있도록 하기 위해 고객 셀프 수리(CSR) 부품을 다량 사용하여 설계되었습니다. 진단 기간 동안 HP(또는 HP 서비스 공급업체 또는 서비스 협력업체)에서 CSR 부품을 사용하여 수리가 가능하다고 판단되면 HP는 해당 부품을 바로 사용자에게 보내어 사용자가 교체할 수 있도록 합니다. CSR 부품에는 두 가지 종류가 있습니다.

- **고객 셀프 수리가 의무 사항인 필수 부품.** 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.
- **고객 셀프 수리가 선택 사항인 부품.** 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

참고: 일부 HP 부품은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 만족스러운 고객 보증을 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다. 이러한 부품들은 Illustrated Parts Catalog에 "No"라고 표시되어 있습니다.

CSR 부품은 재고 상태와 지리적 조건이 허용하는 경우 다음 영업일 납품이 가능하도록 배송이 이루어집니다. 지리적 조건이 허용하는 경우 추가 비용이 청구되는 조건으로 당일 또는 4시간 배송이 가능할 수도 있습니다. 도움이 필요하시면 HP 기술 지원 센터로 전화하십시오. 전문 기술자가 전화로 도움을 줄 것입니다. HP는 결함이 발생한 부품을 HP로 반환해야 하는지 여부를 CSR 교체 부품과 함께 배송된 자료에 지정합니다. 결함이 발생한 부품을 HP로 반환해야 하는 경우에는 지정된 기간 내(통상 영업일 기준 5일)에 HP로 반환해야 합니다. 이 때 결함이 발생한 부품은 제공된 포장 재료에 넣어 관련 설명서와 함께 반환해야 합니다. 결함이 발생한 부품을 반환하지 않는 경우 HP가 교체 부품에 대해 비용을 청구할 수 있습니다. 고객 셀프 수리의 경우, HP는 모든 운송 및 부품 반환 비용을 부담하며 이용할 운송업체 및 택배 서비스를 결정합니다.

HP 고객 셀프 수리 프로그램에 대한 자세한 내용은 가까운 서비스 제공업체에 문의하십시오. 북미 지역의 프로그램에 대해서는 HP 웹 사이트(<http://www.hp.com/go/selfrepair>)를 참조하십시오.

Acronyms and abbreviations

ACU

Array Configuration Utility

ADU

Array Diagnostics Utility

CPQONLIN

NetWare Online Array Configuration Utility

CSR

Customer Self Repair

FC

Fibre Channel

ISEE

Instant Support Enterprise Edition

ORCA

Option ROM Configuration for Arrays

OSEM

Open Services Event Manager

PSP

ProLiant Support Pack

SAS

serial attached SCSI

SATA

serial ATA

SIM

Systems Insight Manager

UID

unit identification

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